

7/5/2006 2:41:37 PM

## Process Sheet

DAR001 Dart Helicopters Services Drawing Name : X-TUBE AS 350/355 HI FWD

24A

Number : 12484

This Issue : 7/5/2006 S.O. No. : Part Number : D350748141

Prsht Rev. : NC Drawing Number : D350-748-141 PREL

First Issue : / / Type : LANDING GEAR Project Number : N/A

Previous Run : 27823A Drawing Revision : PREL

Material : Due Date : 7/30/2006 Qty: 1 Um: Each

Written By : JA 06.07.05

Checked & Approved By : JA 06.07.05

Comment : Est Rev:A New Issue 06-07-05 JLM

## Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description:

1.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D350-748-141 CHG001

2.0

D6017115

Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Crosstube Material

D6017-115

2.339" OD X 2.000" ID

Batch: B 27318

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT N/A on both ends as per Folio FA648

2-Turn first side as per Folio FA648

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D350-748-141. BG 06.07.15 1

4.0

QC1

INSPECT ALL DIM TO DIM SHEET

Comment: INSPECT ALL DIM TO DIM SHEET BG 06.07.15 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

NOTE: Date & initial all entries

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Date: Wednesday, 7/5/2006 2:41:37 PM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 27824A

Part Number: D350748141

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA648

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D350-748-141.

*BB 06-07-15 1*

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

*BB 06-07-15 1*

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

*J-G 06/07/15 1*

8.0

OUTSIDE SERVICE

OUTSIDE SERVICES



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: *1709*

Heat Treat to min 180 KSI As per Dwg D350-748-141

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached

*u 06-07-18*

9.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

*B 06/07/31 P(1)*

10.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

11.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D350-748-141 using CNC bender program \_\_\_\_\_ and Folio FT \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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NOTE: Date & initial all entries

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Date: Wednesday, 7/5/2006 2:41:37 PM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 27824A

Part Number: D350748141

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Remove all marks from tube within limits of D350-748-141

2-Drill Tube as per Dwg D350-748-141

3-Deburr

4-Engrave Part # and Batch # as per Dwg D350-748-141

13.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

14.0

OUTSIDE SERVICE

OUTSIDE SERVICES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: \_\_\_\_\_

LPI as per ASTM 1417 Level 2

Attach copy of NDT results to work order

15.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

16.0

QC6

DIMENSIONAL CHECK



Comment: Inspect for damage & ensure results are as per Dwg D350-748-241

17.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside crosstube as per QSI 005 4.2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

NOTE: Date & initial all entries

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Date: Wednesday, 7/5/2006 2:41:38 PM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 27824A

Part Number: D350748141

Job Number:



Seq. #:

Machine Or Operation:

Description :

18.0

QC14

Inspect Spray Paint



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

19.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

20.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

21.0

D35021

SUPPORT



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

SUPPORT

Batch: \_\_\_\_\_

22.0

D2856400

Abrasion Strip



Comment: Qty.: 1.2401 f(s)/Unit Total : 1.2401 f(s)

Abrasion Strip 7.10" long x2

Batch: \_\_\_\_\_

23.0

ALS41032225

Insert



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Insert

Batch: \_\_\_\_\_

24.0

AN960JD10

Washer



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Washer

Batch: \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
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NOTE: Date & initial all entries

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Date: Wednesday, 7/5/2006 2:41:38 PM  
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## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 27824A

Part Number: D350748141

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)  
Clamp (per MIL-DTL-8783C)  
Batch: \_\_\_\_\_

26.0

MS35206344

Screw



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)  
Screw  
Batch: \_\_\_\_\_

27.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install Ground wire Insert, then insert screw and washer

2-Install Abraison strips as per Dwg D350-748-141 & QSI 035.

3-Install supports as per Dwg D350-748-141, Torque to 60-80 IN-LBS

28.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

29.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1  
Identify and pack for shipping as per PPP D350-748-241  
Location: \_\_\_\_\_  
PPP Rev: \_\_\_\_\_

30.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL  
Inspection Level 21

Job Completion



*Handwritten signature and date: 06-08-09*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

NOTE: Date & initial all entries

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

**PRELIMINARY ISSUE**

DESIGN <b>92</b>	DRAWN BY	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO. D350-748-141	REV. B SHEET 1 OF 3
DATE 06.06.30		TITLE CROSSTUBE (AS 350/355 HI FWD) SCALE NTS	
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6017-115 & PRIME AND PAINT	

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP
1	MS35206-344	SCREW

**D350-748-141 CROSSTUBE:**

- 1) MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125  
FINISHED LENGTH = 110.27±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 AFTER TURNING
- 6) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 7) FINISH: POWDER COAT WHITE (4.3.5.2) OUTSIDE PER DART QSI 005 4.3.  
PRIME INSIDE PER DART QSI 005 4.2.  
OR  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 8) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 9) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 10) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 11) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 12) ALL DIMENSIONS ARE IN INCHES
- 13) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

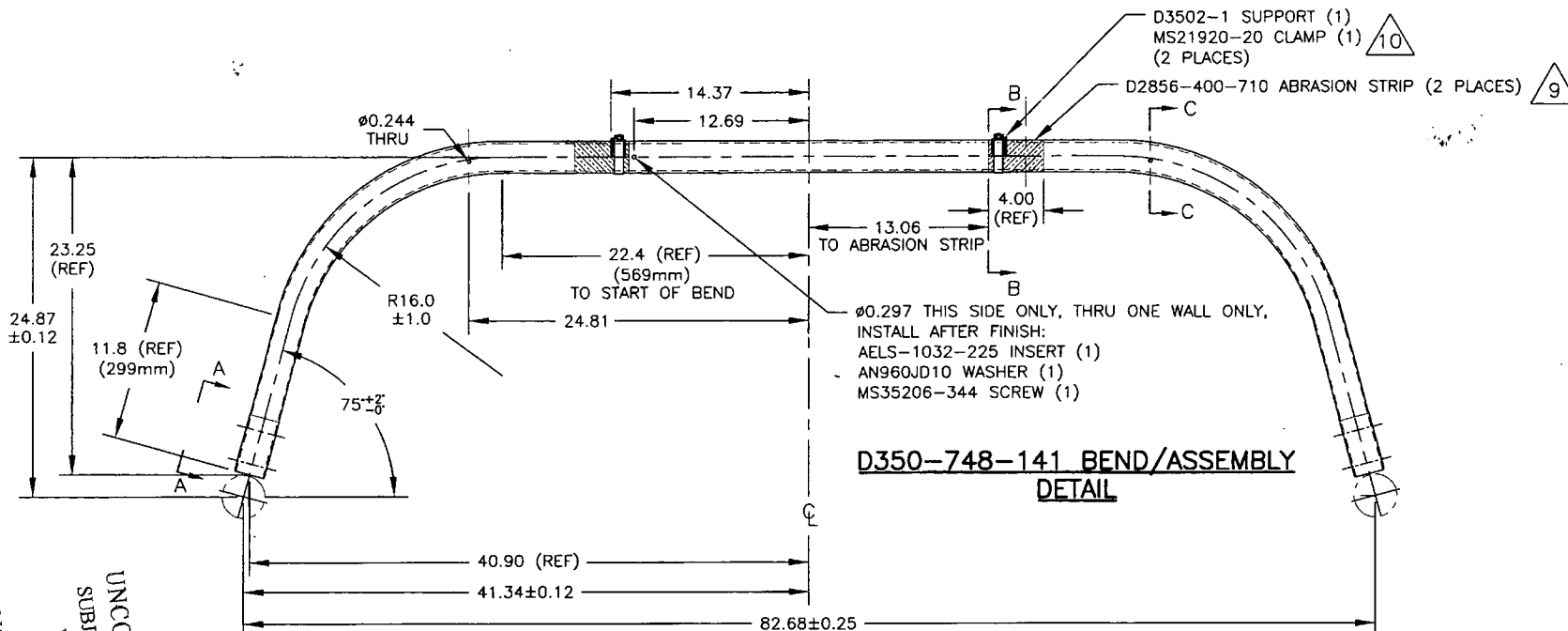
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WITHOUT NOTICE  
WORK ORDER  
NO. **27824A**

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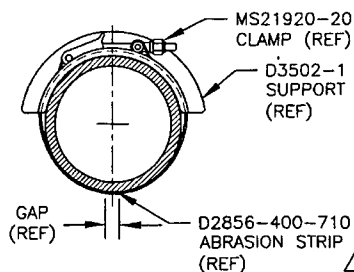


PRELIMINARY ISSUE



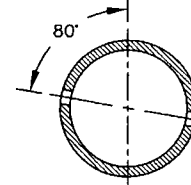
**SECTION B-B**

SCALE 1:2



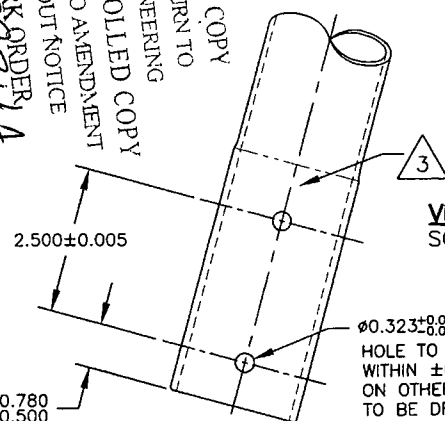
**SECTION C-C**

SCALE 1:2



**VIEW A-A**

SCALE 1:2



Ø0.323±0.005 (THRU, TYP)  
HOLE TO BE ALIGNED  
WITHIN ±0.001 OF HOLE  
ON OTHER SIDE OF CUFF,  
TO BE DRILLED AFTER BENDING

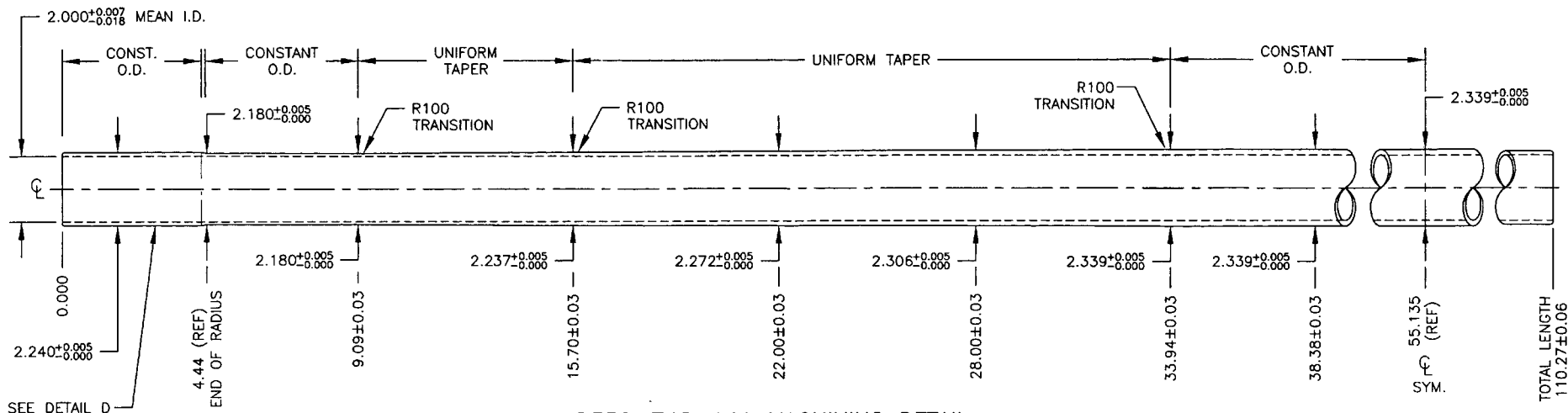
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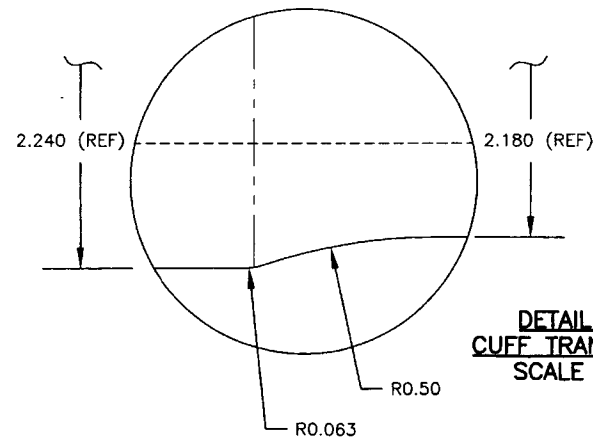
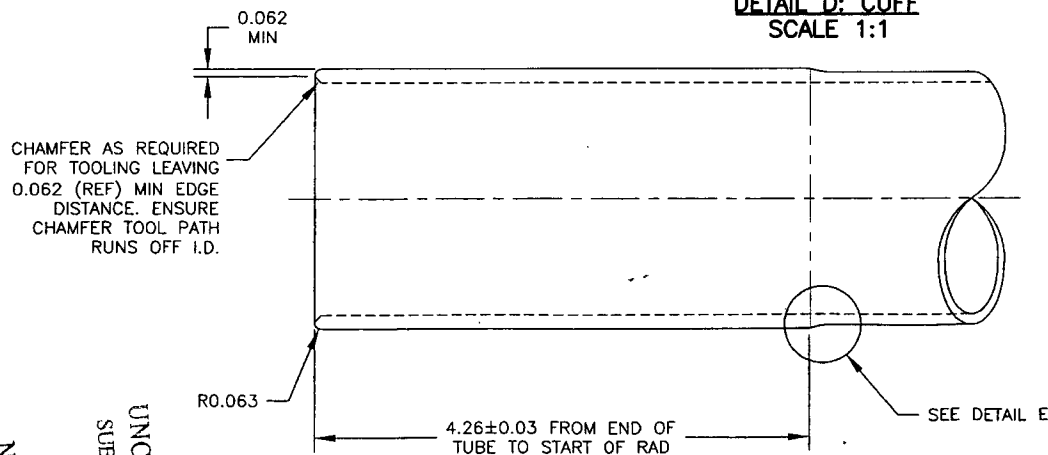
DESIGN	g	DRAWN BY	<b>DART</b>	DART AEROSPACE LTD. MISSISSAUGA, ONTARIO, CANADA
CHECKED		APPROVED	DRAWING NO. D350-748-141	REV. B SHEET 2 OF 3
DATE	06.06.30		TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE 1:8





**D350-748-141 MACHINING DETAIL**

**DETAIL D: CUFF  
SCALE 1:1**



**DETAIL E:  
CUFF TRANSITION  
SCALE 9:1**

**PRELIMINARY ISSUE**

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DATE 06.06.30		CHECKED	APPROVED	TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE 1:3

NO. 27824A  
WORK ORDER  
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RETURN TO  
ENGINEERING

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>
<b>Description:</b> <u>35 CROSS TUBE 350 FWD</u>		<b>Part Number:</b> <u>D 350-748-141</u>
<b>Inspection Dwg:</b> <u>B</u>	<b>Rev:</b> <u>B</u>	Page 1 of 1

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article     ☒ Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
0.062	$\pm .010$	.062	✓			
4.26	$\pm .030$	4.26	✓			
2.240	$\pm .005$ $- .000$	2.244	✓			✓
2.180	$\pm .005$ $- .000$	2.183	✓			✓
2.180	$\pm .005$ $- .000$	2.184	✓			✓
2.237	$\pm .005$ $- .000$	2.242	✓			+0.007"
2.272	$\pm .005$ $- .000$	2.276	✓			✓
2.306	$\pm .005$ $- .000$	3.311	✓			+0.007"
2.339	$\pm .005$ $- .000$	2.340	✓			-0.005"
2.339	$\pm .005$ $- .000$	2.340	✓			✓
110.27	$\pm .060$	110.27	✓			Centre 2.339" is +0.005"
0.062	$\pm .010$	.062	✓			
4.26	$\pm .030$	4.26	✓			
2.240	$\pm .005$ $- .000$	2.244	✓			+0.006" +0.008"
2.180	$\pm .005$ $- .000$	2.184	✓			+0.008" ✓
2.180	$\pm .005$ $- .000$	2.184	✓			+0.008" ✓
2.237	$\pm .005$ $- .000$	2.241	✓			✓
2.272	$\pm .005$ $- .000$	2.277	✓			+0.007" ✓
2.306	$\pm .005$ $- .000$	3.311	✓			✓
2.339	$\pm .005$ $- .000$	2.340	✓			✓
2.339	$\pm .005$ $- .000$	2.340	✓			✓

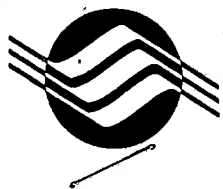
<b>Measured by:</b> <u>RL</u>	<b>Audited by:</b> <u>J.G</u>	<b>Prototype Approval:</b>
<b>Date:</b> <u>06.07.15</u>	<b>Date:</b> <u>06/07/15</u>	<b>Date:</b>

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/JLM	









**VAC AERO**  
INTERNATIONAL INC.

284

**PACKING SLIP**

OAK 77605-1

07/28/2006

MM/DD/YYYY

PAGE: 1



HEAD OFFICE  
1371 SPEERS ROAD, OAKVILLE, ONTARIO  
CANADA L6L 2X5  
TEL: (905) 827-4171 FAX: (905) 827-7489



QUEBEC DIVISION  
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC  
CANADA H4S 1C5  
TEL: (514) 334-4240 FAX: (514) 334-6269

GST No.: R105468102

1DAR01

BILL TO: DART AEROSPACE LTD.  
1270 ABERDEEN ST.  
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.  
1270 ABERDEEN ST.  
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
07/28/2006		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
1709		COD

LN	PART NO	DESCRIPTION	UOM	QTY ORDERED	QTY SHIPPED	B/O QTY
01	D350-CROSS TUBES		EA	8	8	0
		Process Specifications: Procedure: 4353 HEAT TREATED TO 180-200 KSI PER AMS 2759-1C MATERIAL: 4130  D350-748-141 B27823A, B27824A, B27825A, B27826A D350-748-241 B27830A, B27829A, B27827A, B27828A  NOTE: SAND BLAST TUBES				
02	LC	LOT CHARGE 320LBS X \$2.26/LB		1	1	0

No claims for shortage in weight or count will be entertained, unless presented within 5 working days after receipt of materials by customer.



VACUUM BRAZING · HEAT TREATING · SPECIAL PROCESSING · FURNACE EQUIPMENT



HEAT

